Hazard Control Plan Cover Sheet

Work/Activity: Produce Sampling and Monitoring for the Foodstuffs Monitoring Program Identification Number: LANL-RRES-ECO-SF-HCP/OP-001, R4 **Author:** Phil Fresquez Signature Name Date **Initial Risk Level:** Low Consultation Concurrence __ Required Not Required Not Required Required Name (ECO Subject-Matter Expert) Signature (as required) Date Name (Independent Peer) Signature (as required) Date Safety Officer Signature Date Signature Team Leader Date Residual Risk Level: Minimal **Authorization of Work:** Group or Deputy Group Leader Signature Date

Next Review Date:

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

1.0 INTRODUCTION

1.1 Background

A description of the Produce Monitoring Program is provided in the Foodstuffs Monitoring portion of the Environmental Monitoring Plan for 1999–2001 (LA-UR-99-1117).

1.2 In this Document

This procedure addresses the following major topics:

Section	Topic	Page
1.0	Introduction	1
1.1	Background	1
1.2	In this Document	1
1.3	History of Revision	1
2.0	Purpose	1
3.0	Scope	1
4.0	Definitions	2
4.1	Terms	2
5.0	Responsibilities	2
5.1	Principle Investigator	2
5.2	Workers	2
5.3	Line Managers/Supervisors	3
5.4	Subject-Matter Experts	3
6.0	Precautions and Limitations	3
7.0	Safe Work Practice Requirements	3
7.1	Define the Work	3
7.2	Identify and Evaluate Hazards	8
7.3	Develop and Implement Controls	8
7.4	Perform Work Safely	10
7.5	Provide Feedback and Continuous Improvement	10
8.0	Risk Determination	10
9.0	Training	11
10.0	References	11
10.1	Source Documents	11
10.2	Document Coordination	11

1.3 History of Revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes	
0	10/4/96	New document	
1	3/99	Reformatted in accordance with LIR300-00-01,	
		Safe Work Practices	
2	4/01	Added new Section 9.0, Training	
3	4/02	Change in directorate.	
4	4/03	Team name change to Environmental Surveillance	

2.0 PURPOSE

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

This Environmental Surveillance Team procedure describes the process for collecting and preparing produce as part of the Foodstuffs Monitoring Program, as mandated by DOE Order 5400.1, 5400.5.

3.0 SCOPE

This procedure applies to the individual assigned to collect produce as part of the Foodstuffs Monitoring Program. The principle investigator (PI) is Phil Fresquez, the lead technician is Louis Naranjo, Jr., and the assistant is Rick Velasquez.

4.0 DEFINITIONS

4.1 Terms

<u>Foodstuffs</u>: produce (fruits, vegetables, and grains), fish (surface feeders and bottom feeders), eggs, milk, brewed tea, honey, and game animals.

<u>Produce</u>: any fruit, vegetable, and/or grain that could be consumed directly from a garden or an orchard after simple washing.

5.0 RESPONSIBILITIES

5.1 Principle Investigator

PIs are responsible for

- Defining the components of and the processes associated with the work in sufficient detail to enable hazards to be identified and adequately controlled;
- Determining required training for workers;
- Ensuring that assigned workers are trained and meet authorization to work standards; and
- Ensuring that workers have the knowledge, skills, and abilities needed to perform the work safely.

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

5.2 Workers

Workers, with assistance as needed, are responsible for

- Identifying and evaluating the hazards associated with the work, as necessary, to ensure that the controls are adequate to perform the work safely;
- Defining, establishing, and maintaining, as assigned, a hazard-control system that
 effectively mitigates the hazards associated with the work and meets institutional
 and facility requirements;
- Determining that the work has been authorized before proceeding with it;
- Acquiring the knowledge and skills needed to perform the work;
- Obtaining and maintaining authorization to perform the work;
- Understanding and following all operational requirements and restrictions related to the work;
- Performing the work safely;
- Improving the safety of the work by reviewing the work, commensurate with the level of risk, and incorporating lessons learned;
- Using an appropriate change-control process to document and communicate changes made in the hazard control system; and
- Stopping the work if it seems to be unsafe.

5.0 RESPONSIBILITIES

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4

Approval Date: 04/03

5.3 Line Managers/ Supervisors

Line managers/supervisors are responsible for

- Defining the scope of work;
- Ensuring that an effective hazard-control system is established to reduce the risk posed by the work to an acceptable level;
- A periodic review of the process used to assign and mitigate initial risk;
- Ensuring that institutional and facility requirements and restrictions on the work are followed:
- Authorizing the defined work, when the risk has been controlled to an acceptable level;
- Authorizing workers to perform the work, after they have documented adequate knowledge, skills, and abilities;
- Ensuring that workers perform the work safely;
- Improving the safety of the work by reviewing the work, commensurate with the level of risk, and ensuring the incorporation of lessons learned; and
- Ensuring that an appropriate change-control process is used to document and communicate changes made in the hazard-control system.

5.4 Subject Matter Experts

Not applicable to the procedures described in this document.

6.0 PRECAUTIONS AND LIMITATIONS

This document establishes the basic requirements for collecting produce samples for the Environmental Monitoring Program. This procedure applies to all personnel performing field procedures described in this document. Work performed under this procedure by LANL personnel will occur only after all other applicable procedures have been reviewed and signed as listed under Section 7.0 of this document.

7.0 SAFE WORK PRACTICE REQUIREMENTS

7.1 Define the Work: Collection of Samples <u>Project Personnel</u> - In accordance with the procedure for field work, a minimum of two people is required to go out in the field.

<u>Personal Protective Equipment</u> - For produce sampling, the following personal protective equipment must be worn: safety glasses, safety/field shoes, rubber gloves, and a hat.

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

<u>Sample Types</u> - Three types of produce are collected:

- fruits: apricots, apples, crabapples, peaches, pears, plums, melons, cherries, etc.
- vegetables: chile, sweet corn, cucumbers, lettuce, pumpkins, squash, tomatoes, etc.
- grain: corn, wheat, oats, etc.

7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

Collection of Samples (cont.)

Sample Locations - Samples of produce are collected from three areas:

- On-site: This area includes sites on Laboratory property.
- Perimeter: This area includes Los Alamos townsite, White Rock/ Pajarito Acres, San Ildefonso, and Cochiti.
- Regional background: This area includes the Española Valley (from Pojoaque to Velarde), Santa Fe, and Jemez.

<u>Number of Samples</u> - The following table indicates the number of composite samples that should be collected from each area.

Note: This table is a guide for the ideal distribution of samples. Because of many factors that are beyond the control of gardeners and farmers, especially weather, it may not be possible to adhere to this distribution every year.

	On-site Lab	Los Alamos	White Rock/ Pajarito Acres	Española Valley
Vegetables		2	2	1
Fruits	5	2	2	1
Grains		2	2	1
	Santa Fe	Jemez	San Ildefonso	Cochiti
Vegetables	1	1	2	2
Fruits	1	1	2	2
Grains	1	1	2	2

<u>Equipment Needed</u> - Additional specific equipment required for going into the field is given in the operating procedure "General Field Work" (LANL-RRES-ECO-SOP-001, R2).

The following equipment is required for produce sampling:

- plastic gloves
- zip-lock bags (gallon size)
- marker for labeling bags
- ice chest with ice
- chain-of-custody forms (see procedure LANL-RRES-ECO-HCP/OP-SF-008, R2 and Attachment 1)

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

<u>Sampling Produce</u> - Each year, when produce to be sampled is ripe (between July and September), plan trips to each sampling location and perform the following steps:

Step	Action
1	Follow the procedure governing general field work (LANL-RRES-ECO-HCP/OP-001, R2). Check the condition of the vehicle and the fuel level before leaving for the field.
2	Travel to the sampling location and obtain permission from the garden owner to collect produce. It is best if you can collect the samples directly from the garden.
3	Collect approximately three pounds of produce and place into a zip-lock bag. Label the bag with the sample location, date, time, and your initials.

7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

Collection of Samples (cont.)

Each year, plan trips to sampling locations and perform the following steps (cont.):

Step	Action
4	Place the bags in the cooler with ice for transport back to the laboratory. Complete a chain-of-custody form (Attachment 1) with the appropriate sampling information, and follow applicable chain-of-custody procedures for samples (refer to LANL-RRES-ECO-HCP/OP-SF-008, R2) until submitted to an analytical laboratory for analysis. We currently employ Paragon Analytics, Inc., Fort Collins, CO.
5	Once at the lab, store the samples on ice or in a freezer until they are processed (normally within two working days).

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

Processing of Samples

<u>Equipment Needed</u> - The following equipment is required for processing the samples:

- safety glasses and safety shoes
- lab coat and rubber gloves
- cutting boards, knives, and cut-resistant gloves
- balance
- glass beakers (50-mL, 100-mL, 1-L, and 2-L volumes; one for each sample)
- aluminum foil
- hot-mitts/pot holders
- hot plate
- watch glass (one for each tritium sample)
- plastic wrap (e.g., Saran wrapTM)
- ice cubes
- small paper bags (i.e., lunch bags; one for each sample)
- Wiley mill with a 40-mm screen
- drying and ashing ovens
- polyethylene bottles (20-mL and 500-mL volumes; one for each sample)
- zip-lock bags and labeling pens
- chain-of-custody tape

<u>Sample Processing</u> - Within two days of collection, process the samples by following the steps below:

Step	Action
1	Separate collected produce by variety, assembling composite samples of each type of fruit, vegetable, or grain from on-site, perimeter, and background sites.
2	Assign ID numbers to samples, and label 1-L and 2-L beakers, poly-bottles, and bags with these numbers. Larger bags used for submitting samples should be labeled with sample location, date, time, and then initialed.
3	Remove a subsample of produce from each composite for analysis of tritium. Dice the subsample and place in 1-L sample beakers, as described in step 4.

7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

Processing of Samples (cont.)

<u>Sample Processing</u> - Within two days of collection, process the samples by following the steps below (cont.):

Step	Action
4	To obtain samples for tritium analysis, follow the steps below (refer to
	Attachment 2 for schematic of setup):
	Begin by placing a 100-mL beaker upside-down in the center of a 1L

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

	 sample beaker, with a 50-mL beaker right-side-up on top of it. Then place produce in the beaker. Cover the top of the large beaker with a watch glass and seal with plastic wrap. To aid in condensation of the water-sample, fill a beaker with ice and place it on top of the watch glass. Place the sample on a hot plate, warming at a low temperature until water begins to condense on the watch glass. Be certain that the condensation drips into the 50-mL sampling beaker. CAUTION!! Hot plate and glassware will become hot! Use care when handling these items. Collect about 10mL of distillate from each sample, and carefully place sample into labeled 20-mL polyethylene bottles. Seal each bottle with chain-of-custody tape, and record each sample on the appropriate chain-of-custody form. Place all tritium samples and the c-of-c form into a labeled zip-lock bag and refrigerate until samples are submitted to Paragon Analytics, Inc.
5	Thoroughly rinse the remaining produce with water, as though being washed for human consumption. Pat the produce dry with paper towels, and cut it into pieces to facilitate oven drying.
6	 To obtain samples for heavy-metal analysis: Remove approximately 100g (fresh weight) of produce from the composite. Place samples into labeled paper bags. Dry the samples in the oven at 75°C for 48 hours. Remove the produce from the oven, and grind each sample through a 40mm screen using the Wiley mill. Training on operation of the mill will be hands-on by a previously trained member of the Soils and Foodstuffs team. Place ground samples of produce into labeled 20-mL polyethylene bottles, and then seal the bottles with chain-of-custody tape. Record all samples on a chain-of-custody form, and then place all samples for heavy metals into a labeled zip-lock bag until submitted to Paragon Analytics, Inc.

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

Processing of Samples (cont.)

<u>Sample Processing</u> - Within two days of collection, process the samples by following the steps below (cont.):

Step	Action
7	All remaining samples will be used for radiochemistry analysis. CAUTION!! During drying and ashing procedures, ovens and glassware will become hot! Use care when handling these items.
	 Prepare the sample beakers: Weigh the 2-L beaker to determine the tare weight and record this value in the laboratory notebook. Place approximately 500 to 2000g of produce into labeled 2-L tared beakers and weigh to the nearest 0.01g to determine gross weight. Split a large sample into two beakers to serve as replicates for analysis. Record the fresh weight of the samples (subtract the tare weight from the gross weight) in the laboratory notebook.
	 Dry the samples: Cover each beaker with vented aluminum foil and place in the drying oven, carefully noting the placement-order of the beakers in the lab notebook. Dry the samples in the beakers at about 75°C for 5 days. After the fifth day, weigh the samples to the nearest 0.01g. Continue drying and weighing the beakers each day until sample weights are constant (+10%) in two successive weighings. When the samples are dry, remove them from the oven and weigh them to the nearest 0.01g. Subtract the original tare weight from this gross weight to calculate the dry weight of each produce sample. Enter this data in the laboratory notebook.
	 Ash the samples: Place samples in the ashing oven, <u>carefully noting placement of beakers</u>, and ash the samples for 5 days. During ashing, raise the temperature stepwise from 75°C to 500°C to avoid explosive combustion of the organic materials in the early stages of the process. After ashing is complete, reweigh the samples to the nearest 0.01g. Calculate ash weights by subtracting tare weights from gross ash-weights. Record ash weights in the lab notebook. Transfer each ash sample to a 500-mL polyethylene bottle and label the bottle. Seal the bottles with chain-of-custody tape and record samples on a chain-of-custody form. Place all samples in a labeled zip-lock bag to be turned over to Paragon Analytics, Inc., with the appropriate chain-of-custody form.

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

Submittal of Samples

<u>Submitting the Samples</u> - Submit all samples to Paragon Analytics, Inc., for tritium, heavy metal, and radiochemical analyses.

Request the following analyses on the appropriate chain-of-custody forms:

- analysis of tritium content; reported in pCi/L of moisture
- analysis of the following heavy metals: Ag, As, Be, Cd, Cr, Hg, Ni, Pb, Sb, Se, Tl, and Zn (plus the others on EPA's Target Analyte List); reported in μg/g (dry weight)
- analysis of the following radionuclides: strontium-90, cesium-137, plutonium-238, plutonium-239/240, and americium-241; reported in pCi/g (dry weight)
- analysis of total uranium; reported in µg/g (dry weight)

7.2 Identify and Evaluate	<u>Hazard</u>	Initial Risk Level based or Severity and Likelihood	ı
Hazards	In the Field:		
	A) Off-road automobile accidents and	tripping or falling hazards	LOW
	B) Wildlife encounters (plague, hantav	virus, ticks, etc.)	LOW
	C) Environmental hazards (weather)		LOW
	D) Lifting and moving heavy items		LOW
	In the Laboratory		
	E) Use of electrical appliances (hot pla	ates and ovens)	LOW
	F) Hot and/or broken glass		LOW
	G) Splattering of hot water		LOW
	H) Drying and ashing ovens		LOW
	I) The Wiley Mill		LOW
	J) Use of knives		LOW

K) Repetitive motion and other ergonomic hazards

7.3 Develop and Implement Controls

LOW

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

7.3.1	
Develor	pment

<u>Hazard</u>	Hazard Control	Residual Risk Level
A Off-road automobile accidents and tripping or falling hazards	LANL personnel will follow operating procedures discussing off-road vehicle use and tripping or falling hazards. Appropriate footgear and clothing will be worn by all LANL personnel. Personnel will have first aid/CPR training.	MINIMAL

7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)				
7.3.1 Development (cont.)	<u>Hazard</u>	Hazard Control	Residual Risk Level	
	B Wildlife encounters (plague, hantavirus, ticks, etc.)	In accordance with recommendations set by the State of New Mexico Environmental Department, all personnel should wear long pants, long-sleeved shirts, and insect repellent. Do not handle dead or sick rodents. When you have returned from the field, perform a self-check for the presence of ticks.	MINIMAL	
	C Environmental hazards (weather)	LANL personnel will cease operations during inclement weather as described in RRES-ECO operating procedures for conducting general fieldwork. All work will be performed within a safe distance to vehicles. The distance will be based on current field conditions and terrain with respect to current and expected weather conditions.	MINIMAL	
	D Lifting and moving heavy items	Use carts and dollies. Use a helper.	MINIMAL	
	E Use of electrical appliances (hot plates and ovens)	Wear safety glasses, lab coat, steel-toe safety shoes, and rubber gloves. Be familiar with the operator's manuals for each piece of equipment.	MINIMAL	
	F Hot and/or broken glass	Wear safety glasses, lab coat, steel-toe safety shoes, and rubber gloves.	MINIMAL	

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4

Approval Date: 04/03

G Splattering of hot water	Wear safety glasses, lab coat, steel-toe safety shoes, and rubber gloves.	MINIMAL
H Drying and ashing ovens	Use hot-mitts or pot holders when working with the ovens, hot-plates, or hot beakers.	MINIMAL
I The Wiley Mill	Wear safety glasses, lab coat, steel-toe safety shoes, and rubber gloves. Be familiar with the operator's manuals for each piece of equipment.	MINIMAL
J Use of knives	When knives are being used, cut-resistant gloves should be worn to prevent injuries.	MINIMAL
K Repetitive motion and other ergonomic hazards	Take a short break every hour.	MINIMAL

7.0 SAFE WORK PRACTICE REQUIREMENTS (cont.)

7.3.2 **Documentation**

All personnel assigned to participate in produce sampling will have read this hazard control plan/operating procedure and will have signed an acknowledgment (Attachment 3).

Any future changes to this operating procedure will be properly documented and will be reflected by the revision number that is included with the document identification number.

7.3.3 Authorization of Work

All LANL workers involved with this activity will obtain authorization from their direct supervisor, group leader, or deputy group leader. No work will be performed until this authorization has been granted. The residual risk level for performing activities related to this activity have been determined based on consultation with subject matter experts including contractor personnel and LANL personnel experienced in this type of procedure.

All work related to this activity will be reviewed, at a minimum, on an annual basis, and this document updated to reflect changes as deemed necessary.

7.3.4 Authorization of Workers

LANL workers will be granted authorization to perform this work only after they have reviewed all appropriate required documentation and training that applies to LANL personnel. All contractor personnel will perform this work only after they have provided proof of appropriate documentation that applies to contractor responsibilities.

7.4 Perform Work Safely

All personnel involved with this activity will adhere to all safety guidelines and procedures as described in the appropriate documents, including this document. Contractor personnel will be responsible for ensuring self-readiness checks before performing the work. LANL personnel will perform self-readiness checks before performing fieldwork. Field conditions, including weather conditions, will be evaluated as to the effect they will have on performing field activities safely. If activities can not be performed safely, all activities will cease until such time the LANL project leader authorizes work to resume.

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

7.5 Provide Feedback and Continuous Improvement At a minimum, the activity described in this document will be evaluated annually. If any changes are made to the procedure, those changes will be evaluated as to whether or not they may introduce new hazards. Any new hazards will be evaluated and appropriate controls implemented to reduce their risk to an acceptable level. A periodic review with project personnel will be made to evaluate the accuracy of this document with respect to field operations.

8.0 RISK DETERMINATION

The determination of risk for each activity described in this document was based on the Risk Determination matrix given in LIR300-00-01, Safe Work Practices.

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

9.0 TRAINING

The following training must be completed and confirmed by the PI of the project before work can begin:

For each worker:

- General Field Work HCP/OP (LANL-RRES-ECO-HCP/OP-001) must be read and documented.
- Thermal Stress Awareness Training must be taken when it becomes available

For each field crew:

- At least two people must have current First Aid Training.
- At least two people must have current CPR Training.
- Members must have site-specific training as required by the location where work is occurring.

10.0 REFERENCES

10.1 Source Documents

The following documents, which can be found in the Team Leaders (Phil Fresquez) Office located at TA-21, Building 210, Room 222, are referenced in this procedure:

(Due to current revisions, some document numbers may change)

- LAUR-99-1117, "Environmental Monitoring Plan"
- LANL-RRES-ECO-HCP/OP-SF-008, "Chain-of-custody for Environmental Samples"
- LANL-RRES-ECO-HCP/OP-001, "General Field Work"
- LANL-RRES-ECO-HCP/OP-SF-010, "Boat/Raft and Water Safety."

10.2 Document Coordination

RRES-ECO (Ecology Group) of the Risk Reduction and Environmental Stewardship Division is the group of institutional coordination responsible for developing, revising, and maintaining the contents of this document.

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Los Alamos National Laboratory
LANL-RRES-ECO-SF-HCP/OP-001, R4
Approval Date: 04/03

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

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Attachment 1

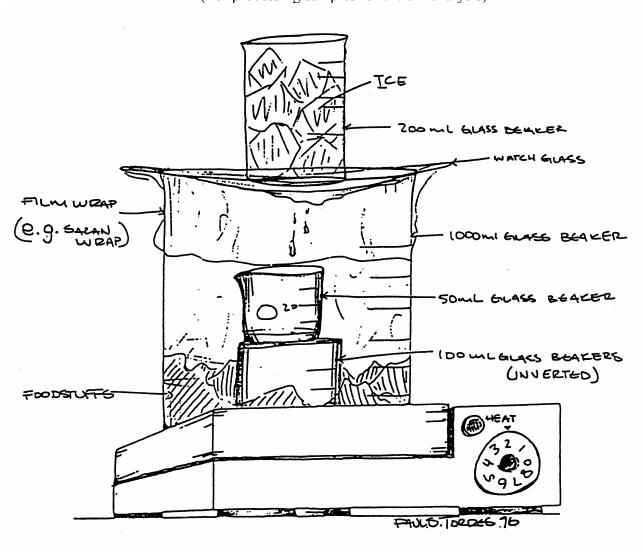
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CHAIN-OF-CUSTODY RECORD

Los Alamos

Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

ATTACHMENT 2: SCHEMATIC OF DISTILLATION SETUP (For processing samples for tritium analysis)



Los Alamos National Laboratory LANL-RRES-ECO-SF-HCP/OP-001, R4 Approval Date: 04/03

PRODUCE SAMPLING FOR THE FOODSTUFFS MONITORING PROGRAM

Attachment 3

Training Documentation Sheet

Hazard Control Plan/Operating Procedure for Produce Sampling for the Foodstuffs Monitoring Program

I, the undersigned, have read and fully understand the Hazard Control Plan/Operating Procedure

for produce sampling for the foodstuffs monitoring	program.	
Signature	Date	
Print Name		
Self-Study Training (Supervisor's Signature)	Date	
On-the-Job Training (Supervisor's Signature)	Date	